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Associations among Trauma, Posttraumatic Stress Disorder, Cannabis Use, and Cannabis Use Disorder in a Nationally Representative Epidemiologic Sample

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Abstract

Introduction—Research in community and clinical samples has documented elevated rates of cannabis use and cannabis use disorders (CUDs) among individuals with trauma exposure and posttraumatic stress disorder (PTSD). However, there is a lack of research investigating relations between, and correlates of, trauma and cannabis phenotypes in epidemiologic samples. The current study examined associations between trauma (i.e., lifetime trauma exposure and PTSD) and cannabis phenotypes (i.e., lifetime cannabis use and CUD) in a nationally representative sample.

Methods—Participants were individuals who participated in waves 1 and 2 of the National Epidemiologic Survey on Alcohol and Related Conditions (n=34,396; 52.4% women; M_{age}=48.0 years, *SD*=16.9).

Results—Lifetime *DSM-IV* Criterion A trauma exposure was significantly associated with lifetime cannabis use (*OR*=1.215) but was only marginally associated with CUD (*OR*=0.997). Within the trauma-exposed sample, lifetime PTSD showed a significant association with CUD (*OR*=1.217) but was only marginally associated with lifetime cannabis use (*OR*=0.992).

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Conclusions—Partially consistent with hypotheses, lifetime trauma was associated with greater odds of lifetime cannabis use while PTSD was associated with greater odds of CUD. Longitudinal research investigating patterns of onset of these events/disorders is needed.

Keywords

Cannabis; Cannabis Use Disorder; Marijuana; Posttraumatic stress disorder; Trauma; Substance use

1. Introduction

Likely due to the widespread use of cannabis (SAMHSA, 2014), cannabis use disorders (CUD; cannabis abuse or dependence) are the most prevalent of the illicit substance use disorders (SAMHSA, 2014). In addition to being a precursor to CUD, cannabis use is related to a number of psychosocial problems, such as delinquency, unemployment, and poor educational attainment (Compton, Simmons, Weiss, & West, 2011), as well as cognitive deficits and impairments in attention and memory (Lundqvist, 2005). Furthermore, individuals with a history of CUD are more likely to endorse a number of psychiatric disorders and correlates, such as anxiety disorders, depression, suicidal ideation, and posttraumatic stress disorder (Bonn-Miller, Harris, & Trafton, 2012; Buckner, Joiner, Schmidt, & Zvolensky, 2012).

Increasing state-level legalization of medical cannabis for the treatment of posttraumatic stress disorder (PTSD), coupled with the observation that PTSD symptoms are associated with coping-oriented cannabis use (Bonn-Miller, Vujanovic, Feldner, Bernstein, & Zvolensky, 2007), has led researchers to begin to study this co-occurrence. Empirical research on trauma/PTSD and cannabis has primarily either focused on the impact of each on treatment of the other (e.g., Bonn-Miller, Boden, Vujanovic, & Drescher, 2013; Bonn-Miller, Moos, Boden, Kimerling, & Trafton, 2014) or risk factors associated with the development/maintenance of their interrelations (e.g., Babson & Bonn-Miller, 2014; Irons, Babson, Bergeria, & Bonn-Miller, 2014). While these studies represent important strides in understanding exactly *why* these two disorders are related, what remains is a general scarcity of large, nationally representative data speaking to *how* trauma/PTSD and cannabis/CUD are related.

Indeed, there has been only one epidemiologic study specifically focused on the co-occurrence of trauma and cannabis phenotypes. Utilizing the National Comorbidity Survey (NCS-R; Kessler et al., 2004), Cougle and colleagues sought to understand the predictive ability of lifetime and past-year PTSD diagnosis in relation to lifetime and current cannabis use. Findings indicated that a history of PTSD was associated with greater odds of lifetime, current, and daily cannabis use, above and beyond a number of demographic and psychiatric covariates, including trauma load (Cougle, Bonn-Miller, Vujanovic, Zvolensky, & Hawkins, 2011). Although Cougle and colleagues covaried for trauma load in models investigating associations between PTSD and cannabis use, they did not examine whether having *any* trauma exposure was associated with increased likelihood of cannabis use in the general sample. Therefore, it is unclear whether trauma exposure itself is a possible risk marker for cannabis phenotypes. In addition, the Cougle et al. (2011) study examined only one cannabis

phenotype: cannabis use. As CUDs, not simply cannabis use, appear to show a unique relation with PTSD in non-epidemiological samples (e.g., Boden, Babson, Vujanovic, Short, & Bonn-Miller, 2013), the inclusion of CUDs in epidemiological models is important. The current study sought to expand on the initial epidemiological study by examining associations between lifetime trauma phenotypes (i.e., trauma exposure, PTSD) and cannabis phenotypes (i.e., cannabis use, CUD) in a nationally representative epidemiologic sample of adults living in the United States. It was hypothesized that lifetime endorsement of trauma and PTSD would be associated with greater odds of lifetime cannabis use and CUD.

2. Method

2.1. Participants and Procedures

The National Epidemiologic Survey on Alcohol and Related Conditions (NESARC) is a longitudinal study of a nationally representative sample of US adults aged 18 years and older, sponsored by the National Institute of Alcohol Abuse and Alcoholism (NIAAA) (4th ed.; DSM-IV; American Psychiatric Association, 1994). Initial baseline interviews were conducted in 2001/2 (n=43,093, response rate: 81.0%), and a follow-up wave was administered in 2004/5 (n=34,653, response rate: 86.7%). Interviews were conducted in person by trained, lay interviewers. Additional details about the NESARC methods have been published elsewhere (see Grant & Dawson, 2006). The current investigation is limited to the subset of the sample that completed waves 1 and 2, given that trauma phenotypes were only assessed at wave 2.

2.2. Measures

The NIAAA Alcohol Use Disorder and Associated Disabilities Interview Schedule for *DSM-IV* (AUDADIS-IV; Grant, Dawson, & Hasin, 2001) was administered at waves 1 and 2. The AUDADIS-IV was used to assess lifetime cannabis use, CUD, and other axis I disorders at both waves, as well as lifetime *DSM-IV* PTSD Criterion A trauma exposure and PTSD at wave 2. The reliability and validity of the AUDADIS-IV have been evaluated, with good test-retest reliability and moderate agreement with structured clinical interviews (Ruan et al., 2008).

2.2.1. Cannabis Use and CUDs—Cannabis use and disorders were assessed at waves 1 and 2. Individuals were determined to meet criteria for lifetime cannabis use if they endorsed ever having used cannabis at either wave 1 or wave 2. Individuals were characterized as having a lifetime CUD if they met *DSM-IV* criteria for lifetime cannabis abuse or dependence at either wave.

2.2.2. Trauma and PTSD Assessment—Lifetime traumatic event exposure and PTSD were *only* assessed at wave 2. Within the PTSD module, respondents were queried on whether they had experienced a range of potentially traumatic events (see Table 1 for a list of event types queried). A “trauma load” variable was computed based on the total number of potentially traumatic event categories participants endorsed. *DSM-IV* Criterion A for PTSD was assessed for participants’ self-identified “worst” traumatic event (see Table 1 for

rates of "worst" event types in the trauma-exposed sub-samples), with individuals endorsing Criterion A being designated as having a history of trauma exposure. All other PTSD symptoms were assessed in reference to participants' "worst" Criterion A event.

2.2.3. Additional Axis I Disorders—Lifetime diagnoses were assessed using the AUDADIS-IV at waves 1 and 2 and were determined based on *DSM-IV* criteria for major depression, generalized anxiety disorder, panic disorder (with or without agoraphobia), social anxiety disorder, and alcohol dependence. Participants were coded as having a lifetime diagnosis of a disorder if they met criteria at time of participation in wave 1 or in the follow-up wave 2.

2.2.4. Personality Disorders—Lifetime personality disorder diagnoses were assessed using the AUDADIS-IV and were based on *DSM-IV* criteria. Avoidant, dependent, obsessive-compulsive, paranoid, schizoid, histrionic, and antisocial personality disorders were assessed at wave 1 and borderline, schizotypal, and narcissistic PDs were assessed at wave 2. Lifetime personality disorder (0=no history, 1=positive history) was included as a covariate in the logistic regression models.

2.3. Data Analytic Plan

The NESARC-provided sampling weight was applied for all analyses to ensure representativeness of the United States population. NESARC weighting methods are described in further detail elsewhere (e.g., Grant & Dawson, 2006). Four hierarchical logistic regressions were conducted to examine associations between lifetime trauma phenotypes and cannabis phenotypes: (1) Lifetime trauma exposure in relation to lifetime cannabis use in the full wave 2 sample (n=34,396); (2) Lifetime trauma exposure in relation to lifetime CUD among those endorsing lifetime cannabis use (n=7,438); (3) Lifetime PTSD in relation to lifetime cannabis use in the trauma-exposed subsample (n=12,305); and (4) Lifetime PTSD in relation to lifetime CUD in the trauma-exposed subsample endorsing lifetime cannabis use (n=2,990). The covariates of gender, age, race/ethnicity, lifetime axis I diagnoses (i.e., major depression, generalized anxiety disorder, panic disorder [with or without agoraphobia], social anxiety disorder, and alcohol dependence), and lifetime personality disorder were entered at level one of the regression models. The covariate of trauma load (i.e., number of trauma categories endorsed) also was included as a covariate in models 3 and 4, outlined above, to assure that associations between PTSD and cannabis phenotypes did not simply reflect an effect for trauma severity. Regression models examining potential interactions between sex and trauma or PTSD also were examined; however, given that no significant sex-trauma interactions were detected (p's > .05), we present only the primary models here. All analyses were conducted in SPSS (version 21.0).

3. Results

3.1. Sample Characteristics

Table 1 provides characteristics for all sub-samples.

3.2. Associations between Trauma Phenotypes and Cannabis Phenotypes

See Table 2 for logistic regression output.

3.2.1 Criterion A Predicting Cannabis Phenotypes (Full Sample; n= 34, 396)— After accounting for demographic characteristics and lifetime history of other axis I diagnoses, a lifetime history of Criterion A trauma exposure was associated with an increased likelihood of lifetime cannabis use (*OR* = 1.215).

3.2.2 PTSD Predicting Cannabis Phenotypes (Criterion A Sample; n= 12,305)— Among the sub-set of participants meeting criteria for lifetime Criterion A trauma exposure, after accounting for demographics, lifetime axis I diagnoses, and lifetime personality disorder, a lifetime history of PTSD was very marginally associated with increased odds of lifetime cannabis use (*OR*=0.997).

3.2.3 Criterion A Predicting CUD (Cannabis Using Sample; n= 7,438)—Among participants endorsing lifetime cannabis use, after accounting for relevant covariates, a history of trauma exposure was very marginally associated with increased odds of lifetime CUD (*OR*=0.992).

3.2.4 PTSD Predicting CUD (Cannabis Using Criterion A Sample; n= 2,990)— Among those endorsing lifetime trauma exposure and cannabis use, after accounting for demographics and a lifetime history of Axis I diagnoses, lifetime PTSD was associated with increased likelihood of CUD (*OR* = 1.217).

4. Discussion

The primary aim of the current study was to examine associations between lifetime trauma phenotypes (i.e., trauma exposure and PTSD) and cannabis phenotypes (i.e., cannabis use and CUD) in a nationally representative sample of adults. Partially consistent with hypotheses, lifetime trauma was associated with greater odds of lifetime cannabis use; however, among individuals who had endorsed ever having used cannabis, trauma exposure was only very marginally associated with increased odds of lifetime CUD (*OR*=0.997). In fact, the effect is likely only statistically significant due to the large, weighted sample, which had the effect of narrowing the confidence intervals significantly. Conversely, lifetime PTSD was only marginally associated with lifetime cannabis use (*OR*=0.992); however, it was associated with increased odds of lifetime CUD among trauma-exposed individuals who endorsed lifetime cannabis use. Effect sizes for the trauma-cannabis use and PTSD-CUD associations were fairly modest (*OR*'s = 1.2); however, the observed associations were evident above and beyond lifetime axis I psychopathology, including major depression, generalized anxiety disorder, panic disorder [with or without agoraphobia], social anxiety disorder, and alcohol dependence, as well as personality disorders and demographic factors (i.e., gender, age, and race/ethnicity). While the present relations cannot be attributed to these important demographic and co-occurring disorders, as depicted in Table 2, Criterion A trauma exposure and PTSD are not unique predictors of cannabis use and CUD. As has been documented in the literature more broadly (e.g., Buckner, Heimberg, Schneier, Liu, Wang, & Blanco, 2012; Zvolensky, Cougle, Johnson, Bonn-Miller, & Bernstein, 2010), many

psychological disorders share associations with cannabis use/disorders, both in terms of psychopathology prospectively predicting cannabis use/disorders (e.g., Buckner, Schmidt, Lang, Small, Schlauch, & Lewinsohn, 2008). What is unique about the present study, however, is its depiction of a potential severity effect.

Indeed, the present findings extend prior work, which documented a relation between PTSD diagnosis and cannabis use (Cougle et al., 2011), by highlighting a more nuanced relation between trauma and cannabis. Specifically, it appears that the concurrent relation between trauma phenotype and cannabis phenotype is graduated, such that the less severe trauma phenotype (i.e., Criterion A exposure) is related to the less severe cannabis phenotype (i.e., use), while greater trauma severity (i.e., PTSD diagnosis among trauma-exposed) is related to CUD among trauma-exposed cannabis users. Though the present investigation is cross-sectional in nature, these findings support prior work documenting associations between sub-clinical PTSD symptom severity and coping-oriented cannabis use (Bonn-Miller et al., 2007), as well as PTSD and CUD (Bonn-Miller, Boden, Vujanovic & Drescher, 2013; Bonn-Miller, Harris, & Trafton, 2012).

An important next step will be to evaluate the nature of the associations between trauma and cannabis phenotypes for informing etiological models of risk. It may be the case that common factors (e.g., personality characteristics, family environment, peer group behavior) are associated with risk for both trauma exposure and initiation of cannabis use. Indeed, twin studies have detected common genetic and environmental influences on trauma exposure and alcohol use (McLeod et al., 2001). Alternative models could include unidirectional pathways between trauma exposure and cannabis use; for example, either that cannabis intoxication increases risk for trauma exposure by way of providing riskier environments more generally (e.g., driving under the influence, increased impaired judgment), or that trauma exposure increases risk for cannabis use, due to increased motivation to alleviate trauma-related distress. With respect to PTSD and CUD, similarly, familial liability may account for the association (e.g., Wolf et al., 2010), or that causal pathways may exist (e.g., PTSD leads to CUD due to overutilization of cannabis as a coping strategy). However, the current study findings would suggest that the factors related to trauma exposure and cannabis initiation may not be the same as those associated with risk for PTSD and CUD.

The current study should be interpreted in light of several limitations. First, trauma and PTSD were only assessed at wave 2. Therefore, our ability to examine prospective associations between trauma and cannabis use phenotypes was limited. Second, all data were self-report. Multi-method investigations of cannabis and trauma phenotypes would be useful for understanding greater levels of complexity in associations between trauma and cannabis phenotypes (e.g., identification of common biological or genetic risk factors). Third, the current study cannot provide insight into mechanisms accounting for relations between trauma and cannabis phenotypes or pathways of risk for co-occurring PTSD and CUD. Future studies incorporating clinical laboratory designs (e.g., trauma cue-elicited craving paradigms) and genetically informed models would be useful for identifying mechanisms underlying links among these constructs. Fourth, although the current study covaried for a number of axis I disorders in the models examining associations between trauma and cannabis phenotypes, comprehensive evaluation of patterns of axis I comorbidity

was beyond the scope of this project. Future studies would benefit from further investigation of patterns of covariation among axis I disorders within trauma-exposed, cannabis-using samples to better identify those at greatest risk for comorbid PTSD-CUD. In addition, investigations are needed that examine possible transdiagnostic mechanisms accounting for such patterns, which may inform transdiagnostic prevention and intervention programs among trauma-exposed individuals using cannabis. Furthermore, examination of the role of personality traits and disorders in models of PTSD and CUD would be useful for determining possible developmental trajectories leading to trauma and cannabis phenotypes. In spite of these limitations, the current study provides novel epidemiologic data on the relations between trauma/PTSD and cannabis use/CUD in a nationally representative sample of adults.

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References

American Psychiatric Association. Diagnostic and Statistical Manual of Mental Disorders. 4. Washington, DC: American Psychiatric Association; 1994.

Babson KA, Bonn-Miller MO. Sleep disturbances: implications for cannabis use, cannabis use cessation, and cannabis use treatment. Current Addictions Report. 2014; 1(2):109–114.

Boden MT, Babson KA, Vujanovic AA, Short NA, Bonn-Miller MO. Posttraumatic stress disorder and cannabis use characteristics among military veterans with cannabis dependence. The American Journal on Addictions. 2013; 22(3):277–284. [PubMed: 23617872]

Boden MT, Bonn-Miller MO, Vujanovic A, Drescher K. A prospective investigation of changes in avoidant and active coping and posttraumatic stress disorder symptoms among military veterans. Journal Of Psychopathology & Behavioral Assessment. 2012; 34(4):433–439.

Bonn-Miller MO, Boden MT, Vujanovic AA, Drescher KD. Prospective investigation of the impact of cannabis use disorders on posttraumatic stress disorder symptoms among veterans in residential treatment. Psychological Trauma: Theory, Research, Practice, and Policy. 2013; 5(2):193–200.

Bonn-Miller MO, Harris AH, Trafton JA. Prevalence of cannabis use disorder diagnoses among Veterans in 2002, 2008, and 2009. Psychological Services. 2012; 9:404–416. [PubMed: 22564034]

Bonn-Miller MO, Moos RH, Boden MT, Kimerling R, Trafton JA. The impact of posttraumatic stress disorder on cannabis quit success. 2014 Manuscript under review.

Bonn-Miller MO, Vujanovic AA, Feldner MT, Bernstein A, Zvolensky MJ. Posttraumatic stress symptom severity predicts marijuana use coping motives among traumatic event-exposed marijuana users. Journal Of Traumatic Stress. 2007; 20(4):577–586. [PubMed: 17721963]

Buckner JD, Heimberg RG, Schneier FR, Liu SM, Wang S, Blanco C. The relationship between cannabis use disorders and social anxiety disorder in the national epidemiological study of alcohol and related conditions (NESARC). Drug and Alcohol Dependence. 2012; 124(1–2):128–134. [PubMed: 22266089]

Buckner JD, Joiner TE, Schmidt NB, Zvolensky MJ. Daily marijuana use and suicidality: the unique impact of social anxiety. Addictive Behaviors. 2012; 37(4):387–392. [PubMed: 22154236]

Buckner JD, Schmidt NB, Lang AR, Small JW, Schlauch RC, Lewinsohn PM. Specificity of social anxiety disorder as a risk factor for alcohol and cannabis dependence. Journal of Psychiatric Research. 2008; 42(3):230–239. [PubMed: 17320907]

Compton WM, Grant BF, Colliver JD, Glantz MD, Stinson FS. Prevalence of marijuana use disorders in the United States: 1991–1992 and 2001–2002. Journal American Medical Association. 2004; 291(17):2114–2121.

Cougle JR, Bonn-Miller MO, Vujanovic AA, Zvolensky MJ, Hawkins KA. Posttraumatic stress disorder and cannabis use in a nationally representative sample. Psychology of Addictive Behaviors. 2011; 25(3):554–558. [PubMed: 21480682]

Feldner MT, Monson CM, Friedman MJ. A critical analysis of approaches to targeted PTSD prevention: Current status and theoretically derived future directions. Behavior Modification. 2007; 31(1):80–116. [PubMed: 17179532]

Grant BF, Dawson DA. Introduction to the National Epidemiologic Survey on Alcohol and Related Conditions. Alcohol Research and Health. 2006; 29:74–78.

Irons JG, Babson KA, Bergeria CL, Bonn-Miller MO. Physical activity and cannabis cessation. The American Journal on Addictions. 2014; 23(5):485–492. [PubMed: 24629045]

Kessler RC, Merikangas KR. The national comorbidity survey replication (NCS-R): background and aims. International Journal of Methods in Psychiatric Research. 2004; 13(2):60–68. [PubMed: 15297904]

Lundqvist T. Cognitive consequences of cannabis use: comparison with abuse of stimulants and heroin with regard to attention, memory and executive functions. Pharmacology, Biochemistry, and Behavior. 2005; 81(2):319–330.

McLeod DS, Koenen KC, Meyer JM, Lyons MJ, Eisen S, True W, Goldberg J. Genetic and environmental influences on the relationship among combat exposure, posttraumatic stress disorder symptoms, and alcohol use. Journal Of Traumatic Stress. 2001; 14(2):259. [PubMed: 11469155]

Ruan JW, Goldstein RB, Chou SP, Smith SM, Saha TD, Pickering RP, Grant BF. The Alcohol Use Disorder and Associated Disabilities Interview Schedule-IV (AUDADIS-IV): Reliability of new psychiatric diagnostic modules and risk factors in a general population sample. Drug and Alcohol Dependence. 2008; 92(1):27–36. [PubMed: 17706375]

Substance Abuse and Mental Health Services Administration. Results from the 2013 National Survey on Drug Use and Health: Summary of National Findings. Rockville, MD: Substance Abuse and Mental Health Services Administration; 2014. NSDUH Series H-48, HHS Publication No. (SMA) 14-4863http://www.samhsa.gov/data/sites/default/files/NSDUHresultsPDFWHTML2013/Web/NSDUHresults2013.pdf

Wolf EJ, Miller MW, Krueger RF, Lyons MJ, Tsuang MT, Koenen KC. Posttraumatic stress disorder and the genetic structure of comorbidity. Journal of Abnormal Psychology. 2010; 119(2):320–330. [PubMed: 20455605]

Ystrom E, Reichborn-Kjennerud T, Neale M, Kendler K. Genetic and environmental risk factors for illicit substance use and use disorders: joint analysis of self and co-twin ratings. Behavior Genetics. 2014; 44(1):1–13. [PubMed: 24196977]

Xian H, Chantarujikapong SI, Scherrer JF, Eisen SA, Lyons MJ, Goldberg J, Tsuang M, True WR. Genetic and environmental influences on posttraumatic stress disorder, alcohol, and drug dependence in twin pairs. Drug and Alcohol Dependence. 2000; 61(1):95–102. [PubMed: 11064187]

Zvolensky MJ, Cougle JR, Johnson KA, Bonn-Miller MO, Bernstein A. Marijuana use and panic psychopathology among a representative sample of adults. Experimental and Clinical Psychopharmacology. 2010; 18(2):129–134. [PubMed: 20384424]

Table 1

Descriptive statistics for the total sample and the lifetime trauma-exposed and lifetime cannabis use sub-samples

	Total Sample (n=34,396)	Trauma-Exposed Sub-Sample (n=12,305)	Lifetime Cannabis Use Sub-Sample (n=7,438)	Trauma Exposed Cannabis Users (n=2,990)
Sex (% women)	52.4%	58.2%	41.6%	51.9%
Age (*SD*)	48.0 (16.9)	48.2 (16.0)	40.4 (11.7)	41.5 (11.3)
Trauma Load (*SD*)	3.4 (2.5)	4.4 (2.5)	4.2 (2.8)	5.2 (2.9)
Highest Level of Education Completed				
Less than high school degree	14.0%	12.4%	10.7%	10.8%
High school or GED	28.9%	28.7%	25.5%	23.9%
Some college/2-year degree	31.0%	32.3%	36.0%	37.2%
Bachelor's degree	13.6%	14.0%	14.0%	15.1%
Some graduate school	12.4%	12.6%	13.6%	13.1%
Race/Ethnicity (%)				
White	72.7%	74.7%	77.8%	65.4%
African American	10.8%	10.4%	9.9%	16.2%
American Indian/Alaska Native	2.2%	2.5%	3.1%	2.9%
Asian/Native Hawaiian/Pacific Islander	3.9%	3.4%	1.9%	1.6%
Hispanic/Latino	10.4%	9.0%	7.3%	13.9%
"Worst" Traumatic Event Endorsed				
Illness/accident/injury to loved one	--	29.5%	--	26.1%
Unexpected death of loved one	--	23.6%	--	23.0%
Indirect/direct experience of 9/11	--	11.4%	--	8.8%
"Other" trauma to loved one	--	4.7%	--	5.0%
Witnessing death/serious injury	--	4.0%	--	4.8%
Life-threatening illness	--	3.9%	--	3.2%
Exposure to combat/war zone	--	3.6%	--	2.2%
Serious accident	--	3.4%	--	3.8%
"Other" traumatic event to self	--	3.0%	--	3.4%
Sexual assault	--	2.4%	--	3.9%
Witnessing violence as child	--	2.3%	--	3.7%
Threatened with a weapon	--	2.1%	--	3.3%
Physical assault by partner	--	1.8%	--	2.6%
Natural disaster	--	1.8%	--	1.3%
Physical assault/neglect as a child	--	0.9%	--	1.7%
Kidnapped/stalked	--	0.7%	--	1.0%
Lifetime PTSD	9.7%	18.1%	14.4%	25.3%

	Total Sample (n=34,396)	Trauma-Exposed Sub-Sample (n=12,305)	Lifetime Cannabis Use Sub-Sample (n=7,438)	Trauma Exposed Cannabis Users (n=2,990)
Lifetime Cannabis Use	24.4%	26.0%	--	--
Lifetime Cannabis Use Disorder	11.3%	11.1%	46.3%	42.3%
Lifetime Major Depression	22.8%	29.3%	33.6%	40.1%
Lifetime Generalized Anxiety Disorder	8.0%	11.5%	12.1%	16.0%
Lifetime Social Anxiety Disorder	7.3%	9.4%	12.0%	14.4%
Lifetime Panic Disorder	7.8%	10.2%	12.2%	15.0%
Lifetime Alcohol Dependence	15.7%	17.5%	39.1%	38.4%
Lifetime Personality Disorder	22.5%	28.3%	38.3%	42.6%

Note: “Trauma Load”=number of potentially traumatic event categories endorsed

Table 2

Associations between lifetime trauma and cannabis phenotypes

	Odds Ratio	95% CI	*p*
Model 1: Association between lifetime trauma exposure and cannabis use (n=34,396)			
Level One	**Odds Ratio**	**95% CI**	***p***
Sex (1=male, 2=female)	0.653	0.653–0.654	< .001
Age	0.965	0.965–0.965	< .001
Race/Ethnicity (0: white, 1: non-white)	0.582	0.582–0.583	< .001
Lifetime Major Depression	1.381	1.380–1.383	< .001
Lifetime Generalized Anxiety Disorder	1.080	1.079–1.082	< .001
Lifetime Social Anxiety Disorder	1.155	1.153–1.157	< .001
Lifetime Panic Disorder	1.192	1.190–1.193	< .001
Lifetime Alcohol Dependence	4.386	4.382–4.390	< .001
Lifetime Personality Disorder	1.624	1.622–1.625	< .001
Level Two			
Lifetime trauma (0=no trauma, 1=trauma)	1.215	1.214–1.216	< .001
Model 2: Association between lifetime trauma exposure and CUD among lifetime cannabis users (n=7,438)			
Level One	**Odds Ratio**	**95% CI**	***p***
Sex (1=male, 2=female)	0.513	0.512–0.514	< .001
Age	0.983	0.983–0.984	< .001
Race/Ethnicity (0: white, 1: non-white)	0.959	0.957–0.960	< .001
Lifetime Major Depression	1.235	1.233–1.237	< .001
Lifetime Generalized Anxiety Disorder	1.154	1.151–1.157	< .001
Lifetime Social Anxiety Disorder	1.031	1.029–1.033	< .001
Lifetime Panic Disorder	1.285	1.282–1.288	< .001
Lifetime Alcohol Dependence	2.152	2.149–2.155	< .001
Lifetime Personality Disorder	1.547	1.545–1.550	< .001
Level Two			
Lifetime trauma (0=no trauma, 1=trauma)	0.997	0.996–0.999	< .001
Model 3: Association between lifetime PTSD and cannabis use among trauma-exposed individuals (n=12,305)			
Level One	**Odds Ratio**	**95% CI**	***p***
Sex (1=male, 2=female)	0.666	0.665–0.667	< .001
Age	0.961	0.961–0.961	< .001
Race/Ethnicity (0: white, 1: non-white)	0.670	0.669–0.671	< .001
Trauma Load	1.130	1.130–1.131	< .001
Lifetime Major Depression	1.236	1.234–1.238	< .001
Lifetime Generalized Anxiety Disorder	0.959	0.957–0.961	< .001
Lifetime Social Anxiety Disorder	1.173	1.170–1.175	< .001
Lifetime Panic Disorder	1.092	1.090–1.095	< .001
Lifetime Alcohol Dependence	4.056	4.050–4.063	< .001

	Odds Ratio	95% CI	*p*
Lifetime Personality Disorder	1.328	1.326–1.330	< .001
Level Two			
Lifetime PTSD (0=no PTSD, 1=PTSD)	0.992	0.990–0.994	< .001
Model 4: Association between lifetime PTSD and CUD among trauma-exposed cannabis users (n=2,990)			
Level One	**Odds Ratio**	**95% CI**	***p***
Sex (1=male, 2=female)	0.467	0.466–0.468	< .001
Age	0.982	0.982–0.982	< .001
Race/Ethnicity (0: white, 1: non-white)	1.065	1.062–1.068	< .001
Trauma Load	1.058	1.057–1.058	< .001
Lifetime Major Depression	1.142	1.139–1.144	< .001
Lifetime Generalized Anxiety Disorder	1.303	1.298–1.307	< .001
Lifetime Social Anxiety Disorder	0.952	0.949–0.955	< .001
Lifetime Panic Disorder	1.245	1.241–1.249	< .001
Lifetime Alcohol Dependence	2.167	2.162–2.172	< .001
Lifetime Personality Disorder	1.333	1.330–1.337	< .001
Level Two			
Lifetime PTSD (0=no PTSD, 1=PTSD)	1.217	1.214–1.220	< .001

Note: CUD=cannabis use disorder; PTSD=posttraumatic stress disorder; “Trauma Load”=total number of potentially traumatic event categories endorsed